



Arctic User's Manual

Arctic EDGE Router (2280)



Version 5.4
September 2006

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Revision History:

September 2006, version 5.4, Series 5 update

Declaration of Conformity

(according to ISO/IEC Guide 22 and EN 45014)

Manufacturer's Name:

Viola Systems Ltd.

Manufacturer's Address:

Lemminkäisenkatu 14-18 B
FIN-20520 Turku
Finland

declares that this product:

Product Name:

Arctic EDGE Router

conforms to the following standards:

EMC:

EN 55022 Emission Test (Class A)

1. Radiated Emissions (30-1000MHz)
2. Conducted Emissions (0.15-30MHz)

EN 50082-1 Immunity Test

1. IEC 801-3: Radio Frequency Electromagnetic Field
2. IEC 801-2: Electrostatic Discharge
3. IEC 801-4: Fast Transients, AC Power Ports and Signal cables

Supplementary Information:

"The product complies with the requirements of the Low Voltage Directive 73/23/EEC and EMC directive 89/336/EEC."

Warning: This is a Class A product. In a domestic environment this product may cause radio Interference which may make it necessary for the user to take adequate measures.

Manufacturer's Contact Information:

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Warranty and Safety Instructions

Read these safety instructions carefully before using the products mentioned in this manual:

Warranty will be void if the product is used in any way in contradiction with the instructions given in this manual or if the product has been tampered with.

The devices mentioned in this manual are to be used only according to the instructions described in this manual. Faultless and safe operation of the devices can be guaranteed only if the transport, storage, operation and handling of the devices is appropriate. This also applies to the maintenance of the products.

To prevent damage both the product and any terminal devices must always be switched OFF before connecting or disconnecting any cables. It should be ascertained that different devices used have the same ground potential. Before connecting any power cables the output voltage of the power supply should be checked.

This product is not fault-tolerant and is not designed, manufactured or intended for use or resale as on-line control equipment or as part of such equipment in any hazardous environment requiring fail-safe performance, such as in the operation of nuclear facilities, aircraft navigation or communication systems, air traffic control, direct life support machines, or weapons systems, in which the failure of Viola Systems manufactured hardware or software could lead directly to death, personal injury, or severe physical or environmental damage.

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1. Introduction

Viola Arctic product family offers industrial quality connectivity devices for custom-built wireless and wired device management solutions.

About this User's Manual

This User's Manual describes the operation of the Arctic products. All devices in this User's Manual are referred to as Arctic, unless otherwise mentioned. This manual provides introductory information as well as detailed instructions on how to set up and manage the Arctic as part of a network environment. It is intended for anyone involved in installing and managing Arctic devices. It is assumed that the reader of this manual is familiar with basic working principles of Internet technology.



The Arctic Platform

The Arctic platform utilizes a number of wireless or fixed line interfaces depending on your specific requirements. Arctic is a customizable technology allowing users to develop solutions for their own applications. Arctic devices have been designed to withstand the requirements of extreme environments and industrial use.

Technical Features Summary

The Arctic is available with various networking and I/O options. The following table shows the functional components in the Arctic platform. Details of each component are also listed below.

HARDWARE

CPU Platform:

- 32-bit RISC microcontroller
- 32 MB RAM
- 8 MB Solid state FLASH memory

Network Interface

- 10/100 Base-T Ethernet (RJ45)

Device Interface

- Serial console port (RS-232)

Mechanics

- Stainless steel casing
- Optional DIN-rail mounting tools

SOFTWARE

Operating System

- Multitasking embedded μ CLinux

Supported Protocols

- PPP, IP, ICMP, UDP, TCP, ARP, DNS, DHCP, FTP, TFTP, HTTP

Application Services

- HTTP server, CGI
- FTP client
- Telnet server
- SSH server and client
- Temperature sensor
- Real Time Clock
- Syslog
- DHCP server and client
- Status querying using SMS
- DNS proxy
- SNMP MIB-II

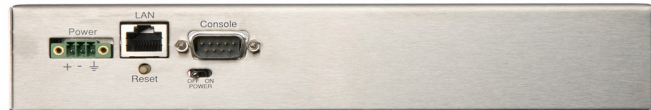
Management and Configuration:

- Web user interface
- Console port
- Telnet

2. Physical Interfaces

The Arctic unit contains three panels for interface connections and status indication. These panels are:

1. Front panel. The front panel includes power supply, Ethernet and console connectors. Also reset switch and power switch are located in front panel.



2. Back panel has the GPRS antenna connector (FME) and SIM card holder

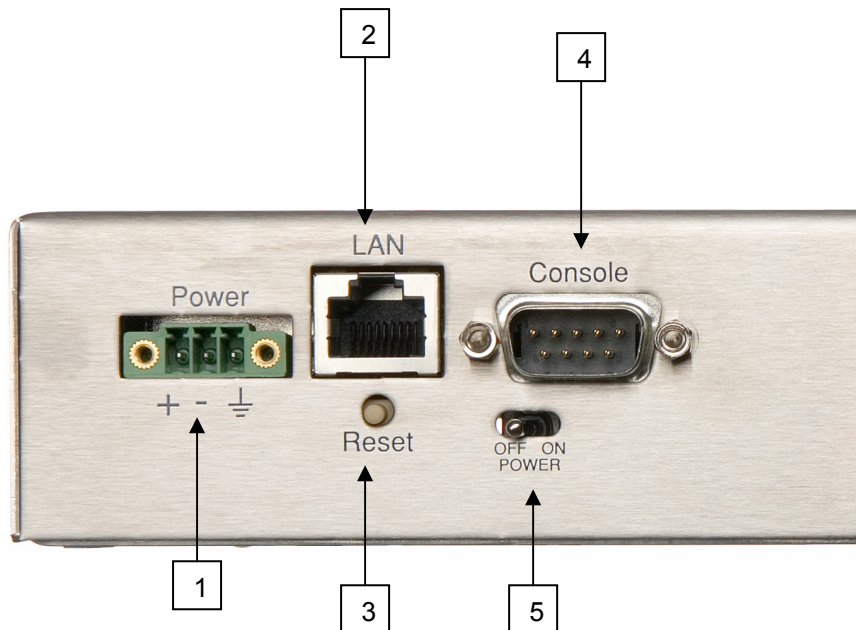


3. Top panel. The side panel contains all LEDs which indicate the status of the device.



Front Panel Description

The front panel of the Arctic consists of the following connectors and switches:

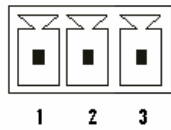


1. Power supply connector (DC IN)
2. Ethernet connector (LAN)
3. Reset switch
4. Console port (RS-232)
5. Power switch

The Arctic has optional DIN-rail mounting kit available. These mountings are attached to bottom or side panel of the device.

Power Supply Connector

The Arctic has a 12 – 32 VDC power supply connector shown below:



Pin 1 is positive (+)
Pin 2 is negative (–)
Pin 3 is GND

The unit is protected against reversed polarity.

Power Switch

Enables or disables the operation of the Arctic.

Console Port (RS-232)

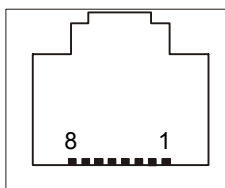
Arctic has one serial port connector for console. The connector is 9-pin male (DB9). A null modem cable may be used to connect the Arctic to a serial device or a PC (terminal setting 19200 8N1, no handshaking).

Ethernet Connector

Arctic has an RJ45 connector for 10/100 Mbps Ethernet connection. Maximum length of the Ethernet cable is 100m.

The cross-connected cable is only for connecting the Arctic to the PC's network interface card. When connecting to a local network (e.g. hub or switch), a direct Ethernet cable must be used.

The figure and pin description of the Arctic's RJ45 Ethernet connector is as follows:



Pin Number	Name	Direction	Explanation
1	Rx+	IN	Data Receive Positive
2	Rx–	IN	Data Receive Negative
3	Tx+	OUT	Data Transmit Positive
4	NC		
5	NC		
6	Tx–	OUT	Data Transmit Negative
7	NC		
8	NC		

Top Panel Description

The side panel of the device contains all LEDs which are used to indicate the status of the Arctic. The LEDs are numbered from 1 to 7 starting from the panel side. A detailed description of each LED is listed below:

LED number	LED Name	LEDs state	Description
1	System	Green, blinking	System is operational
2	Power	Green	Power is on
3	LAN	Green	Ethernet link up
		Not lit	No Ethernet link (cable not connected)
		Green, Blinking	Ethernet traffic
4	GPRS	Green, Blinking	GPRS/EDGE traffic (*)
		Green	GSM data (dial in)
5	Serial	Off	
		Green, Blinking	
6	VPN	Steady On	VPN connected
		Green, Blinking	
7	Error	Red	Error detected

*) For more detailed GPRS LED information, please refer to Chapter 4.

Back Panel Description

The Arctic EDGE Router has an antenna connector and a slot for a SIM card on the back panel.

1. FME connector for an antenna.
2. SIM Card slot.

It is recommended NOT to insert or remove the SIM card while the GPRS module is in operation. The SIM card contents may become corrupted if the card is removed while the GPRS module is writing data to it.

Product Information Label

The product information label on the underside of the Arctic contains the following information:

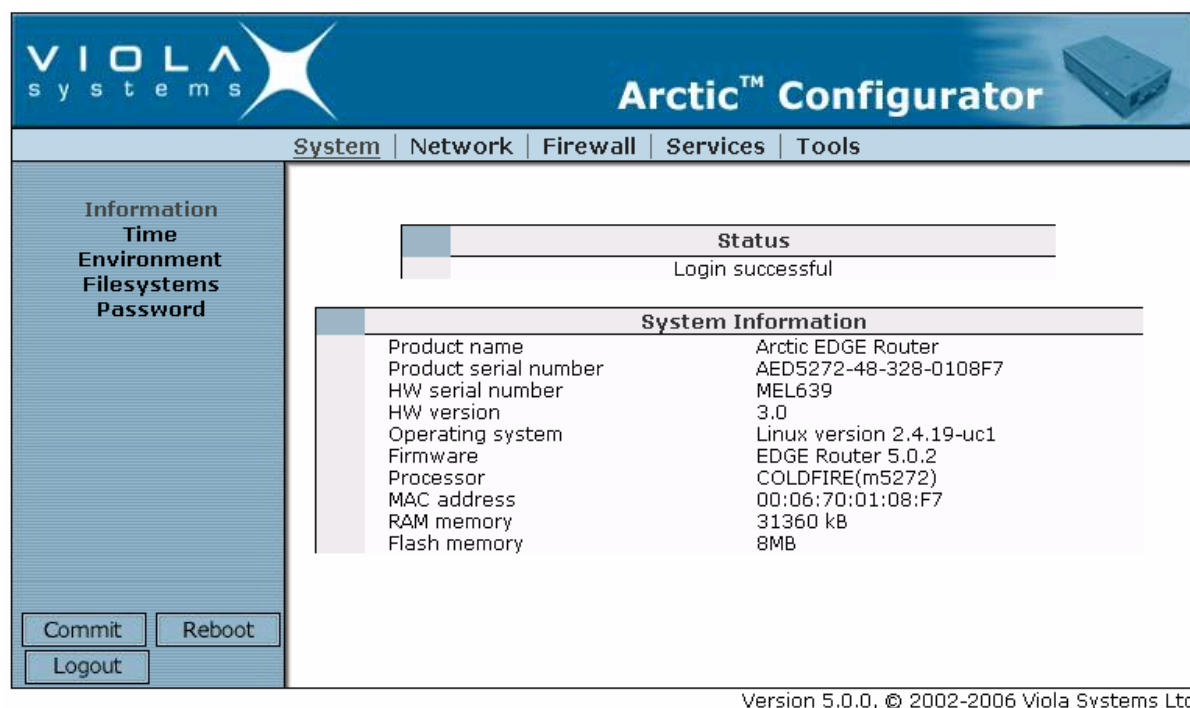
1. Product type
2. Serial number
3. MAC address.

The Ethernet address (MAC address) of the unit is printed on the product label (see below). Each address code starts with the digits "00:06:70", but the remaining six digits are unique for each unit.



Firmware Version

The Arctic firmware version may be checked from the Viola Configurator startup page. (System/Information). It is also possible to get the firmware version by issuing command *firmware* in console.



This manual describes the operation of Series 5 firmware (Arctic EDGE Router 5.x.y)

3. Getting Started

Unpacking the Arctic

Arctic is delivered in a bulk package containing only the device itself. Arctic EDGE Router does not have manufacturing options.

A separate Arctic Accessory Kit (ordered separately) contains the following items:

- Power supply and cable
- Cross-over Ethernet Cable
- Null modem cable.

If any of the items are missing or are damaged, please contact Viola Systems Ltd. All packaging materials are recyclable. Viola Systems urges its customers to follow environmental regulations regarding the disposal of all materials.

Installation of the Arctic

The Arctic can be installed horizontally on a flat surface e.g. on a desk or a rack.

When installing Arctic models with wireless connectivity options it should be remembered that high-frequency radio waves need to be taken into account. The surrounding environment affects the range of radio signals. Therefore, if you are using an Arctic with antennas directly mounted to the antenna connector, try to avoid placing the Arctic where the radio signal might be disturbed ("shadowed") by nearby obstacles. Also large metallic surfaces (racks) may have a highly detrimental effect on the antenna performance. In case of metal racks or surfaces it is recommended to use an external antenna with an appropriately selected cable. By following these precautions the Arctic may be installed more freely.

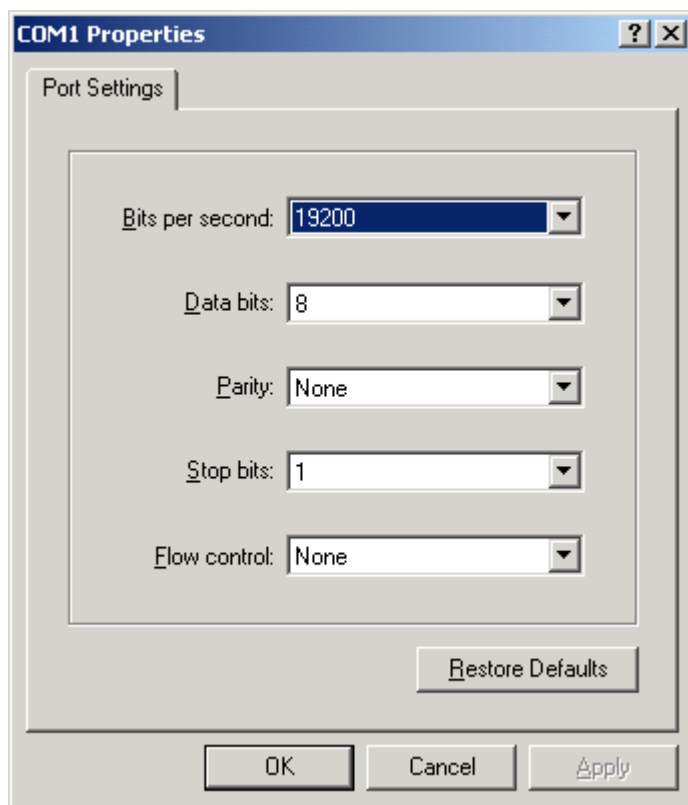
The stainless steel case of the Arctic contains option for DIN-rail mounting.

Setting of the IP Address Using a Console

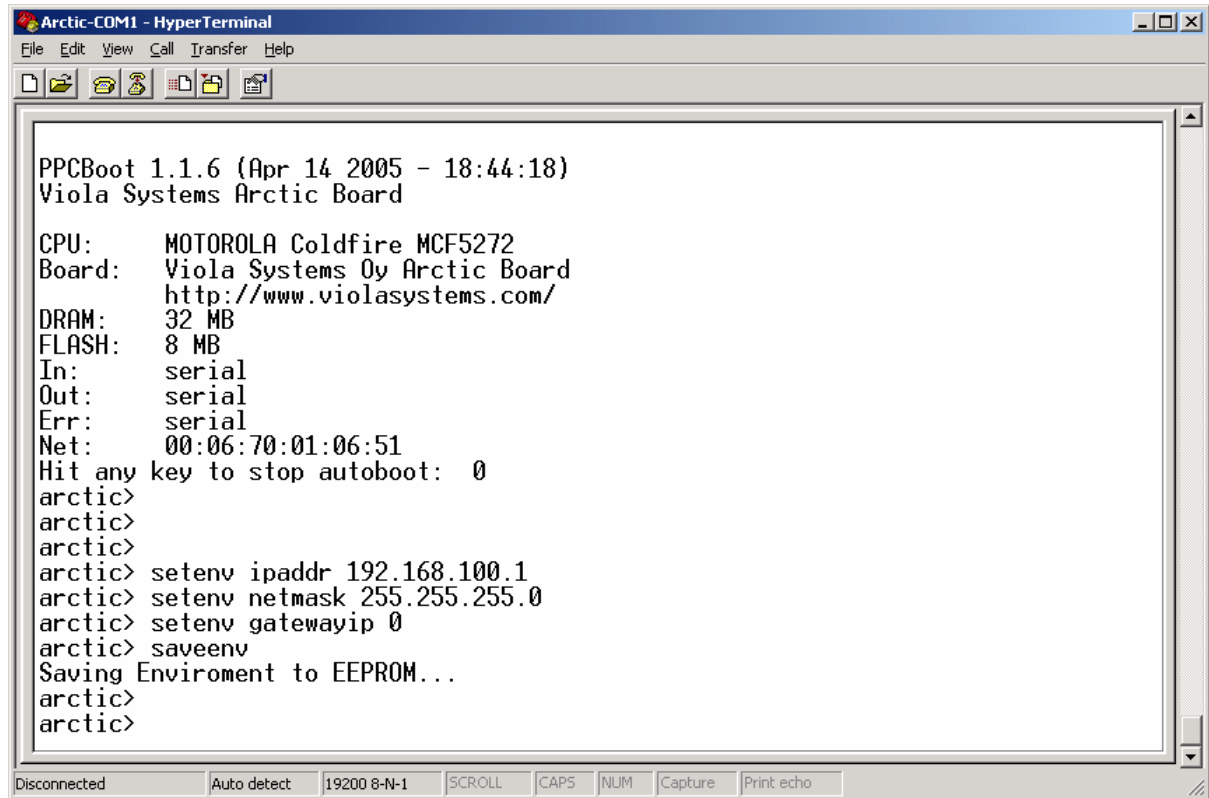
Before installation you need to find out the required network settings. These include the **IP Address**, **Netmask** and **Gateway Settings** used by the Arctic. The local network administrator can provide them to you or you can ask for them from your Internet Service Provider.

If possible, it is recommended to use an HTML browser to set up network settings as described in the next chapter. If using a console, please follow the procedure below:

1. Before beginning, turn off the power from all devices and check that the power switch of the Arctic is in the "OFF" position.
2. Connect a serial cable (crossover) to the console serial port (RS1) and an Ethernet cable to the RJ45 connector.
3. Switch the Arctic on by toggling the power switch to "ON" position
4. Connect to Arctic using COM port and terminal program (Hyperterminal). Serial settings for console (RS1) are 19200-8-N-1 and none handshaking".



5. Stop the PPCboot to get the "Arctic>" command prompt. Set the IP address and netmask using command "setenv"



```
Arctic-COM1 - HyperTerminal
File Edit View Call Transfer Help

PPCBoot 1.1.6 (Apr 14 2005 - 18:44:18)
Viola Systems Arctic Board

CPU:      MOTOROLA Coldfire MCF5272
Board:    Viola Systems Oy Arctic Board
          http://www.violasystems.com/
DRAM:     32 MB
FLASH:    8 MB
In:        serial
Out:       serial
Err:       serial
Net:       00:06:70:01:06:51
Hit any key to stop autoboot: 0
arctic>
arctic>
arctic>
arctic> setenv ipaddr 192.168.100.1
arctic> setenv netmask 255.255.255.0
arctic> setenv gatewayip 0
arctic> saveenv
Saving Enviroment to EEPROM...
arctic>
arctic>
```

6. Save the setting with command “saveenv”.
7. Reboot the Arctic for the settings to take effect

Default gateway value (gatewayip) is usually set to zero (0) because GPRS or VPN is used as default router.

Setting of the IP Address Using an HTML Browser

This is the recommendable way to set up the network parameters. It is an easy-to-apply solution if the computer used for configuration has been properly configured. Follow the procedure listed below:

1. Connect to the Arctic using your HTML browser. The default IP address of the Arctic is "10.10.10.10" (netmask "255.0.0.0"). Note that your computer used to connect to Arctic, needs to be in same address space (eg. IP address 10.10.10.11 for the computer). Check computer's IP address with ping (Windows computer current IP address can be checked with by command `ipconfig /all` in command prompt).
2. From the initial page click **Start Configurator** and enter login information in the following page. Username is `root` and by default no password is set (just leave the field empty).
3. Navigate to Network page and from there to Ethernet subpage (left menu).
4. Enter the IP address (and other network settings) of your choice and click Apply and then Commit to store the settings. Note that usually Ethernet default router is set to zero, because either GPRS or VPN is used as default route.
5. Reboot the Arctic for the settings to take effect.

The screenshot displays the Arctic Configurator web interface. The top header features the Viola Systems logo and the title "Arctic™ Configurator". Below the header is a navigation bar with tabs: System, Network, Firewall, Services, Applications, and Tools. The left sidebar contains a menu with options: Summary, Ethernet, GPRS, Dial-in, SSH-VPN, L2TP-VPN, Monitor, Routing, S-NAT, D-NAT, DNS Update, NTP, and SMS Config. The main content area is titled "Ethernet Settings" and contains the following fields and controls:

- Override Ethernet configuration by DHCP? (Radio buttons for Enabled and Disabled, with Disabled selected)
- Host name: ViolaArctic
- Domain name: (none)
- Ethernet IP address: 192.168.100.1
- Network mask: 255.255.255.0
- Use Ethernet as default route (usually No): No (dropdown menu)
- Default router IP address: 0
- DNS servers (optional): 212.83.96.242, 212.83.96.250
- MAC address: 00:06:70:01:06:51

At the bottom of the settings area are "Apply" and "Reset" buttons. In the bottom left corner of the interface are "Commit", "Reboot", and "Logout" buttons.

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Arctic default password is *empty*. Remember to set the password before connecting the Arctic device to a public network.

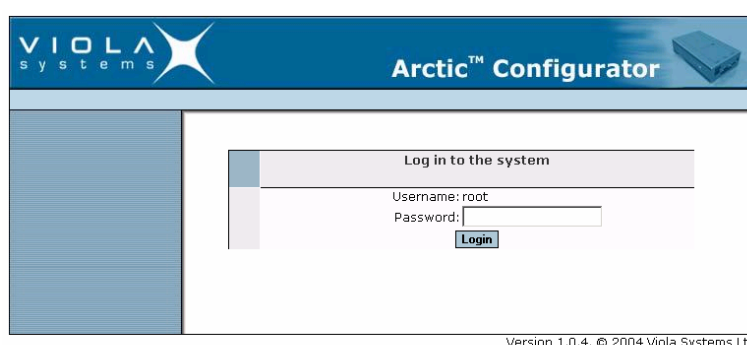
4. Arctic Configurator Tool

The Arctic Configurator is a tool which allows the user to manage the properties of the Arctic device by using a user-friendly, www-based interface. You only need a computer with an HTML browser and a working connection to the Arctic to be able to use the web configurator.

With the Arctic Configurator you can set important parameters, receive status information, and set variables that control which applications and processes run on the Arctic board.

Login to Arctic Configurator

To start using the Arctic Configurator, just open the URL in which the Arctic which you want to configure is located. On the Viola Arctic main page, select the **Start Configurator** link.



First, the Arctic Configurator will ask you for the password for the Arctic device root-account. Enter the correct password in the box provided and press the login-button to start the Arctic Configurator.

Default password for root is empty. Remember to set the password before connecting the device to a public network.

General Usage of the Arctic Configurator

After a successful login, the Arctic Configurator will display the main screen. This consists of the main navigation menu on the top, the secondary navigation bar on the left, and the main screen containing the currently active content and controls.

When first starting the program, the System/Information screen will be shown in the main content area. The main navigation-menu on the top of the screen is used to navigate between the different subsets of settings available. Selecting an item from the main menu will display the available items related to this subset in the secondary navigation bar, selecting the first of these to be shown in the main content area.

The secondary navigation-bar on the left contains the groups of parameters in this subset. Selecting an item from this menu will display the content related to the selected group in the main content area. In the bottom of the secondary navigation-bar is a group of three buttons which are always visible: Commit , Reboot , and Logout. The Commit-button is used to save the memory-resident data for "soft" parameters permanently to disk. Note that the values for the previous parameters are not saved to disk unless the Commit-button is pressed. The Reboot-button, as the name suggests, will reboot the Arctic. The Logout button will end the current session and return to the login-screen.

5. Arctic Software Configuration

System Menu

The System-menu contains items that are relevant to the Arctic board itself. It allows the user to view information about the system or the current executing environment and to set the date and time.

Information – submenu contains general information about the Arctic device. Information on this submenu should be provided if possible when contacting Viola Systems technical support.

Time – submenu contains time information. Arctic has a real time clock with battery backup and time information may be adjusted here.

Updated time data won't be saved permanently until the **Commit** button is pressed. Until then, it will be stored only in RAM memory.

Environment – submenu contains information about the Arctic device memory usage, uptime and inside temperature.

Password – submenu contains password changing. The default password is blank. When changing the password for the first time, the same password has to be written in all three boxes.

Always setup password for Arctic device before connecting it to network. When changing the password for **the first time, the same password has to be written in all three boxes.**

Network Menu

Through the Network-menu you can access sub items to control the various network interface properties. The menu contains items for Ethernet, VPN and GPRS interfaces. Also Email, Proxy and firewall settings are located in this submenu. Summary page shows which interfaces are up and also routing information:

The screenshot shows the Arctic Configurator interface with the 'Network' tab selected. The left sidebar lists various configuration options, and the main area displays network interface details.

Network Interface Summary

Ethernet (eth0)	
HW address	00:06:70:01:06:51
Internet address	172.16.4.100
Status	UP BROADCAST RUNNING MULTICAST
Rx packets	284
Tx packets	128

Loopback (lo)	
Internet address	127.0.0.1
Status	UP LOOPBACK RUNNING
Rx packets	0
Tx packets	0

Running Routes

Destination	Gateway	Genmask	Flags	Iface
172.16.0.0	*	255.255.0.0	U	eth0
127.0.0.0	*	255.0.0.0	U	lo

Running ARP cache

Address	HWtype	HWaddress	Flags	Mask	Iface
172.16.4.15	ether	00:06:5B:C0:59:27	C		eth0

Buttons at the bottom: Commit, Reboot, Logout.

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Ethernet

Configuration for the Arctic Ethernet Interface:

Override Ethernet configuration by DHCP – If this parameter is Enabled Arctic gets the IP address and other related information from a local DHCP server. When enabled, all other settings are disabled on this page.

Host name – Sets the Arctic device hostname. This is important to set up correctly when using a Viola M2M Router and VPN.

Domain name – Domain name for name resolution.

Ethernet IP address – IP address used by *eth0* interface.

Network mask – Network mask used by *eth0* interface

Use Ethernet as default route (usually No) – Defines is next parameter (Default router) used or not. Usually set to "No", because either GPRS or VPN is used as default router.

Default router – Default router used when the direct route to host or network is not know. This parameter applies to *eth0* interface only. When GPRS or VPN is used as default router this parameter has to be set to 0.

DNS servers - Name server IP address for resolving host names to IP address and vice versa. Series 5 firmware also supports automatic DNS server IP addressing from GPRS network. This feature is enabled from GPRS settings (Network→GPRS).

GPRS

GPRS settings include APN and other settings for GPRS network connectivity. More details of GPRS connectivity is in Chapter 7.

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GPRS enabled – When set to yes, GPRS interface is automatically attached to GPRS network.

Access Point Name (GPRS) – GPRS APN name where the connection is made.

PIN code– SIM card pin code.

DNS servers– When set to “From GPRS network”, the DNS servers are obtained automatically from GPRS network. If parameter is set to “User defined”, DNS servers are defined in Ethernet menu. IF DNS proxy is enabled in Arctic, local computers connected to Arctic Ethernet can use the Arctic as DNS server.

Led indication – In Data only mode GPRS LED blinks green when transmitting data. In Informative mode LED blinks also when connected to GPRS network without data transfer (GPRS context is active). On "Informative" mode the GPRS LED behaves following way:

OFF: GPRS Modem turned off

600 ms ON / 600 ms OFF: No SIM card inserted or no PIN entered, or network search in progress

75 ms ON / 3 s OFF: Logged to network

75 ms ON / 75 ms OFF / 75 ms ON / 3 s OFF: GPRS activated

Flashing slow: Indicates GPRS data transfer

ON: GSM Data call on progress

GPRS username – Username used for authentication if APN requires it.

GPRS password – Password used for authentication if APN requires it.

PPP idle timeout – Maximum idle time for GPRS interface. If interface has been idle for this period, the GPRS connection is restarted.

Maximum MTU value – Maximum transfer unit for GPRS.

Use GPRS default route – If enabled, GPRS is used as default route. Ethernet default router has to set to 0.

Dial-in

Configuration for the Arctic PPP dial-in Interface. The dial-in can be used as a backup connection to Arctic.

The screenshot shows the 'Arctic™ Configurator' web interface. The top navigation bar includes 'System', 'Network', 'Firewall', 'Services', 'Applications', and 'Tools'. The left sidebar contains a menu with options: Summary, Ethernet, GPRS, Dial-in (selected), SSH-VPN, L2TP-VPN, Monitor, Routing, S-NAT, D-NAT, DNS Update, NTP, and SMS Config. At the bottom of the sidebar are buttons for 'Commit', 'Reboot', and 'Logout'. The main content area is titled 'Dial-in Settings' and contains the following configuration fields:

Dial-in enabled	Yes
Require authentication (PAP)	Yes
Required username	user
Required password	pass
Idle timeout	150
Local IP address	10.10.100.1
Peer's IP address	10.10.100.2

At the bottom of the settings area are 'Apply' and 'Reset' buttons.

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Dial-in enabled – When enabled, PPP connections can be made to Arctic (GSM data).

Require authentication (PAP) When set to yes password authentication is used for incoming data calls.

Required username – PAP username allowed login.

Required password – PAP password used for authentication.

Idle timeout – Idle time before PPP connection is terminated.

Local IP address – IP address used in PPP peer.

Peer's IP address – IP address used in PPP peer.

SSH-VPN

Arctic has a VPN client that can be used with the Viola M2M Router. For more information about Arctic VPN configuration and Viola M2M Router, please refer to the Viola M2M Router User's Manual.

SSH-VPN Settings	
Use SSH-VPN?	No ▾
Primary server	
Primary interface	GPRS ▾
Primary server IP	127.0.0.1
Primary server port	22
Primary server GW	0
Max duration (0=unlimited)	0
Backup server (optional)	
Use backup SSH-VPN?	No ▾
Backup interface	GPRS ▾
Backup server IP	127.0.0.1
Backup server port	22
Backup server GW	0
Max duration (0=unlimited)	7200
Routing	
Routing mode	None ▾
Remote network IP	0.0.0.0
Remote network mask	255.255.0.0
Apply Reset	

Use SSH-VPN – Defines is SSH-VPN enabled, When set to “Yes”, Arctic will automatically establish VPN connection to Viola M2M Router pointed by parameter “Primary server IP”

Primary Interface – Chooses which interface is used to connect to the VPN.

Primary server port – Defines the SSH server port on Viola M2M Router. Default port is 22.

Primary server GW. – When SSH-VPN interface is defined as Ethernet, this parameter is the Ethernet networks default router, from where the route to the Viola M2M Router is available

Max duration – Usually defined as zero for primary server. For backup server, it defines the time that the VPN connection is kept on before trying again the primary server . For example, if the max duration is 7200 seconds (2 hours), Arctic will try after 2 hours when connected to backup server is the primary server back online.

Backup server is optional for redundancy. When Arctic device is started and the SSH-VPN is enabled, the system automatically establishes the SSH-VPN connection. However, if for some reason this VPN connection is not established or it is disconnected (eg. network failure between Arctic and the Viola M2M Gateway) the connection is tried to IP pointed by backup server.

L2TP-VPN

Arctic has a L2TP client that can be used with L2TP server. L2TP is light weight VPN (no encryption) for networked devices.

L2TP-VPN Settings	
Use L2TP-VPN?	No ▾
Primary server	
Primary interface	GPRS ▾
Primary server IP	0.0.0.0
Primary server port	1701
Primary server gateway	0
Max duration (0=unlimited)	0
Hello interval (secs)	20
L2TP username (usually hostname)	primary_user
L2TP password	pass
Backup server (optional)	
Use backup L2TP-VPN?	No ▾
Backup interface	GPRS ▾
Backup server IP	0.0.0.0
Backup server port	1701
Backup server gateway	0
Max duration (0=unlimited)	7200
Hello interval (secs)	20
L2TP username (usually hostname)	backup_user
L2TP password	passwd
Routing	
Routing mode	None ▾
Remote network IP	0.0.0.0
Remote network mask	255.255.0.0
Apply Reset	

Hello interval – Defines the time between L2TP sends “hello” packet over the VPN (keepalive messages).

Monitor

Monitor is used for GPRS and VPN connection checking. If connection to the selected IP address is lost, the connection is restarted. Monitor uses ICMP echo (ping) packets to check the connection. When used with VPN, the remote IP peer address should be used. When it is used, the monitor checks also the VPN connection.

The screenshot shows the Arctic Configurator web interface. The top navigation bar includes tabs for System, Network, Firewall, Services, Applications, and Tools. The left sidebar contains a menu with options: Summary, Ethernet, GPRS, Dial-in, SSH-VPN, L2TP-VPN, Monitor (highlighted), Routing, S-NAT, D-NAT, DNS Update, NTP, and SMS Config. The main content area is titled 'Connection monitor settings' and contains the following configuration options:

ICMP Echo sending	☐ Enabled ☒ Disabled
Interval (sec)	200
Reply timeout (secs)	20
Retries	3
Target IP address	0.0.0.0
Secondary target IP address (0=none)	0

At the bottom of the settings area are 'Apply' and 'Reset' buttons. Below the sidebar are 'Commit', 'Reboot', and 'Logout' buttons.

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ICMP Echo sending – Selects if the monitor is enabled.

Interval (sec) – Determines how often the connection is checked by sending ICMP echo packets. The interval must be smaller than GPRS idle timeout (typically 2/3 of GPRS idle timeout) in order to have uninterrupted communication

Reply timeout (secs) – The waiting time for reply packets.

Retries timeout (secs) – The number of tries before connections are restarted.

Target IP address – The host IP address to which echo packets are sent to. When VPN is used, the Viola M2M Routers end peer address must be used to check the GPRS connection.

Secondary target IP address – The secondary host IP address to which ICMP echo packets are to be sent if the sending to primary target host IP address fails.

Monitor should be always be enabled to make sure that the GPRS connection stays alive.

Routing

These parameters are used to configure routing settings:

Routing settings	
Act as router?	☒ Enabled ☐ Disabled
Use Proxy ARP?	☐ Enabled ☒ Disabled
Apply Reset	

Act as router – Enables IP forwarding between interfaces. Enabled by default.

Use Proxy ARP – Enables proxy ARP. May be used with Viola M2M Router VPN. Disabled by default.

S-NAT

These parameters are used to configure S-NAT (source network address translation) settings. When enabled, private IP address used in local LAN is changed to GPRS interface IP address. By default, this feature is enabled from all IP addresses (0/0) in eth0. This means, that users connected to Arctic Ethernet can use and for example browse the web by using Arctic as default router.

Source NAT (masquerading LAN to GPRS) settings	
Enable S-NAT	Yes
Use	From IP
Yes	0/0
No	0/0
No	0/0
No	0/0
No	0/0
No	0/0
No	0/0
No	0/0
No	0/0
No	0/0
Apply Reset	

From IP – Only S-NAT connections from the defined IP address are accepted. If defined with wildcard (0/0), all IP addresses are handled the same way (only S-NAT connections are allowed).

D-NAT

These parameters are used to configure D-NAT (destination network address translation) settings. When enabled, packets coming to defined GPRS interface port are forwarded to local IP address.

Source IP – D-NAT only connections coming from IP. Wildcard 0/0 means all IP addresses are D-NATted.

Protocol – Chooses which protocol is port forwarded. If “ANY” is chosen, other parameters are disregarded.

Dest.port – Chooses which GPRS interface is port forwarded to local Ethernet.

Redirect to IP – Chooses where port forwarding is done to.

Redir. port – Chooses which port port forwarding goes to.

For example, if Arctic GPRS ports 8000 and 10000 are needed to be forwarded to device at IP 172.16.4.99, the following rules would be applied. With this configuration, the devices at 172.16.4.99 web server (TCP port 80) could be accessed with browser to Arctic's GPRS IP address. For example, if the GPRS has IP address 10.99.99.99, browser would be connected to: <http://10.99.99.99:8000> to get access to web server running on port 80 at host 172.16.4.99.

Destination NAT (forwarding GPRS to LAN) settings					
Enable D-NAT		Yes ▼			
Use	Protocol	Source IP	Dest. port	Redirect to IP	Redir. port
Yes ▼	TCP ▼	0/0	8000	172.16.4.99	80
Yes ▼	TCP ▼	0/0	10000	172.16.4.99	22
No ▼	ANY ▼				
No ▼	ANY ▼				
No ▼	ANY ▼				
No ▼	ANY ▼				
No ▼	ANY ▼				
No ▼	ANY ▼				
No ▼	ANY ▼				
No ▼	ANY ▼				

If DNAT is needed to be limited to some networks only, the Source IP can be defined in IP/netmask bits format. For example, if DNAT should work only from network 192.168.1.0, the Source IP would be defined to destination NAT rules as 192.168.1.0/24.

DNS Update

These parameters are used to configure dynamic DNS. Arctic can report its dynamic IP address to a DNS server. Arctic supports RFC 2136 dynamic setup.

DNS Update settings	
Enable	No
Record TTL (seconds)	1200
Record refresh interval(seconds)	1000
Zone	exampledomain.com
Authoritative name server address	0.0.0.0
Our domain name	arctic.exampledomain.com
Use Transaction Signatures (TSIG)	No
TSIG key name	key.exampledomain.com
TSIG key value	

The server pointed by Authoritative names server (eg. company's own DNS server, for example ISC BIND) must be configured to accept incoming DNS update messages.

TSIG can be used for better security in DNS updates.

SMS Config

This feature may be used to monitor the Arctic status and to issue simple commands remotely via SMS messages. For detailed information, refer to "SMS Config Application Note".

Enabled - Selects whether the SMS Config function is enabled or disabled.

Firewall Menu

Through the Firewall-menu you can configure built-in firewall of the Arctic. Firewall can be disabled or enabled and separate rules may be created for GPRS to Arctic, GRPS to LAN and LAN to GPRS.

Arctic™ Configurator

System
Network
Firewall
Services
Applications
Tools

Enabled

GPRS to Arctic
GPRS to LAN
LAN to GPRS

GPRS to Arctic Firewall settings			
Use GPRS to Arctic Firewall			Yes
Action	Protocol	From IP	Destination port
ACCEPT	ICMP	0/0	
ACCEPT	TCP	0/0	80
ACCEPT	TCP	0/0	22
ACCEPT	TCP	0/0	23
ACCEPT	TCP	0/0	2402
ACCEPT	TCP	0/0	2404
ACCEPT	TCP	0/0	504
NO RULE	ANY		
NO RULE	ANY		
NO RULE	ANY		

Service Menu

The screenshot shows the Arctic Configurator web interface. At the top is the Viola Systems logo and the title 'Arctic™ Configurator'. Below the title is a navigation bar with tabs: System, Network, Firewall, Services (selected), Applications, and Tools. On the left is a sidebar menu with options: WWW Server, Telnet Server, DHCP Server, DNS Proxy, SNMP Agent, and SSH Server. The main content area is titled 'WWW Server Settings' and contains three settings: 'Web Server' with a radio button selected for 'Enabled' and 'Disabled' for 'Disabled'; 'Web Configuration Access' with a radio button selected for 'Enabled' and 'Disabled' for 'Disabled'; and 'Server port (standard=80)' with a text input field containing '80'. Below these settings are 'Apply' and 'Reset' buttons. At the bottom left of the sidebar are 'Commit', 'Reboot', and 'Logout' buttons. The version 'Version 5.0.0, © 2002-2006 Viola Systems Ltd' is displayed at the bottom right.

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WWW Server

These settings enable or disable the web server functionality.

Web Server – Disables or enables the www server.

Web Configuration Access - Disables or enables web configuration access.

If you disable the web access settings, web configurator stops functioning and you will have to enable it via console if you should need to use it again later.

SSH Server

SSH server is available in Arctic for secure connections. Configuration file located at `/etc/sshd_config` may be edited manually.

SSH Server – Enables or disables the SSH server.

Telnet Server

Telnet server may be used to make terminal connections to the Arctic device shell. A more secure way of performing remote management is based on the SSH.

Telnet server- Enables or disables the telnet server.

DHCP Server

DHCP server listens to broadcast DHCP queries and assigns IP address for host from the configured pool. If needed, Arctic can act as a DHCP server. This is suitable for small remote networks that have for example few laptops connected to the Arctic via an Ethernet hub or a switch.

DHCP Server – Enables or disables the DHCP server.

DHCP server assigns IP address for DHCP clients between the low and high address range. For example, 10 IP address is given to DHCP IP pool in image below

DHCP Server Settings	
DHCP Server	☐ Enabled ☒ Disabled
Mandatory parameters	
Subnet	10.0.0.0
Netmask	255.255.255.0
Address range to share	
Low	10.0.0.10
High	10.0.0.20
Optional parameters, leave blank if not used	
Subnet mask	255.255.255.0
Domain name	"exampledomain.com"
DNS servers	10.0.0.2,10.0.0.3
Default gateway	10.0.0.1
Broadcast address	
Default lease time	
Max. lease time	
NTP server	
Lpr server	
WINS server	
Apply Reset	

Optional parameters can be used to give more network configuration for DHCP client hosts.

Configuring the DHCP server in an erroneous way may cause your network to function badly or may prevent functioning altogether. Consult your network administrator for necessary information **before** setting up the service.

DNS Proxy

With DNS proxy, computers connected to Arctic Ethernet interface can use Arctic as DNS server. Arctic will forward DNS queries to correct DSN server and local computers DNS setting are not needed to be changed.

VIOLA systems Arctic™ Configurator							
System Network Firewall <u>Services</u> Tools							
WWW Server Telnet Server DHCP Server DNS Proxy SNMP Agent SSH Server Commit Reboot Logout	<table border="1"> <thead> <tr> <th colspan="2">DNS Proxy/Forwarder Settings</th> </tr> </thead> <tbody> <tr> <td>DNS Proxy/Forwarder</td> <td> ☐ Enabled ☒ Disabled </td> </tr> <tr> <td colspan="2"> Apply Reset </td> </tr> </tbody> </table>	DNS Proxy/Forwarder Settings		DNS Proxy/Forwarder	☐ Enabled ☒ Disabled	Apply Reset	
DNS Proxy/Forwarder Settings							
DNS Proxy/Forwarder	☐ Enabled ☒ Disabled						
Apply Reset							

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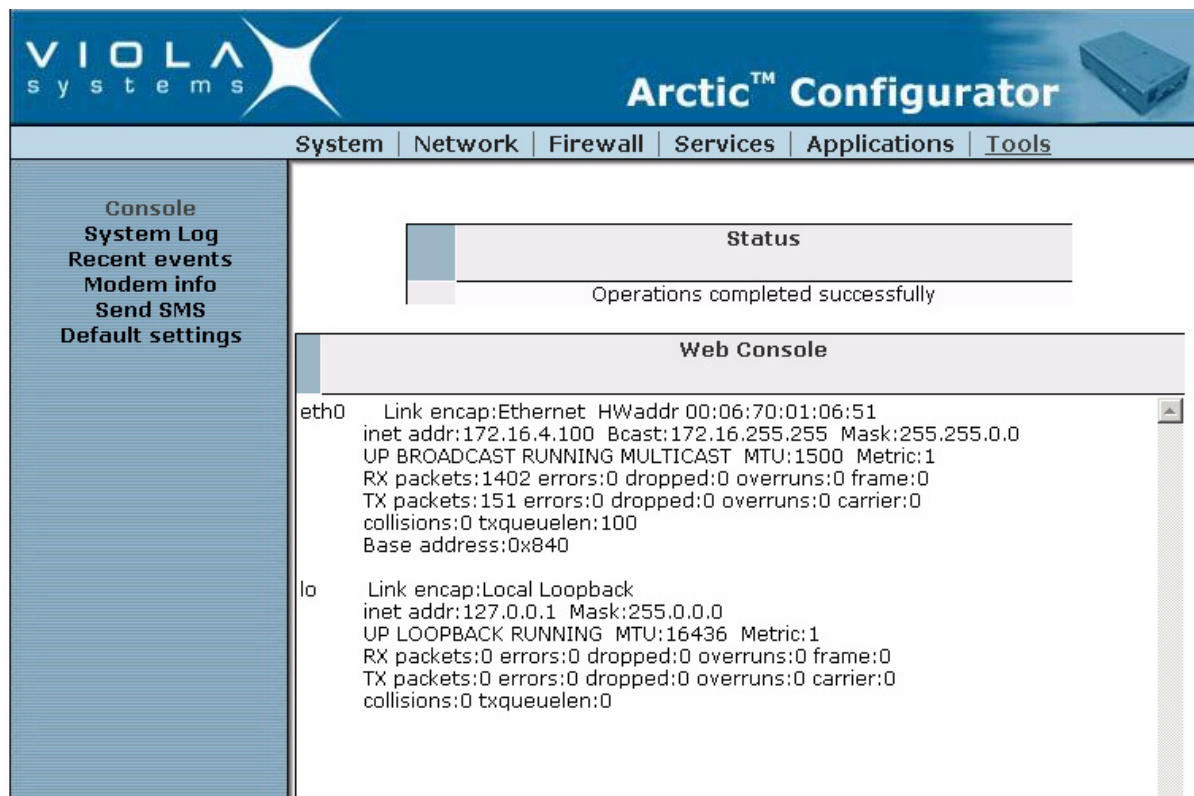
SNMP Agent

The screenshot shows the Arctic Configurator web interface. At the top is a blue header with the 'VIOLA systems' logo on the left and 'Arctic™ Configurator' on the right, accompanied by a small image of the router. Below the header is a navigation bar with tabs: 'System', 'Network', 'Firewall', 'Services', and 'Tools'. The 'Services' tab is selected. On the left side, there is a vertical menu with links: 'WWW Server', 'Telnet Server', 'DHCP Server', 'DNS Proxy', 'SNMP Agent' (which is highlighted), and 'SSH Server'. Below this menu are three buttons: 'Commit', 'Reboot', and 'Logout'. The main content area is titled 'SNMP Settings'. It contains the following configuration options: 'SNMP agent (MIB-II)' with radio buttons for 'Enabled' and 'Disabled' (where 'Disabled' is selected); 'Read only SNMP community' with a text input field containing 'public'; and 'Read and write SNMP community' with a text input field containing 'private'. At the bottom of the settings area are 'Apply' and 'Reset' buttons. In the bottom right corner of the interface, the text 'Version 5.0.0, © 2002-2006 Viola Systems Ltd' is displayed.

SNMP agent supports SNMPv1 MIB-II.

Tools Menu

The Tools menu provides the access to web based tools used for troubleshooting with the Arctic. It is possible to execute simple shell commands through the Web console. Also GPRS information can be obtained from "Modem Info" menu. For example, output from command *ifconfig*



Default settings

Arctic may be set to factory default settings from the Tools menu. This restores factory settings excluding network settings.

7. GPRS and EDGE

The Arctic EDGE Router provides a direct and reliable GPRS/EDGE connection and data transmission to stationary or GSM 850/900/1800/1900 mobile networks around the world.

In this Chapter the specialities related to GPRS and EDGE operation are described.

Placing Arctic EDGE Router

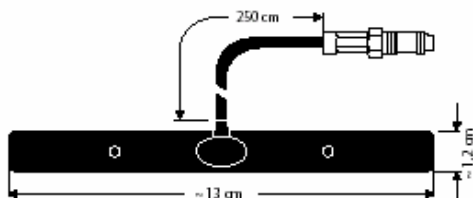
When choosing the installation site of Arctic, please remember that it uses radio waves for data transmission. The surrounding environment affects the behavior of radio signals. Therefore, if you are using an Arctic with the antenna mounted directly to the antenna connector (without an extension cable), try to avoid placing the unit in a location where the radio signal might be shadowed by nearby obstacles. Note also that large metallic surfaces (racks) or walls with metallic structures (cabling, concrete iron) may highly degrade the antenna performance. In case of metal racks or surfaces it is recommended to use an external antenna with an appropriate cable. This allows placing of the Arctic more freely.

GSM/GPRS/EDGE Antenna

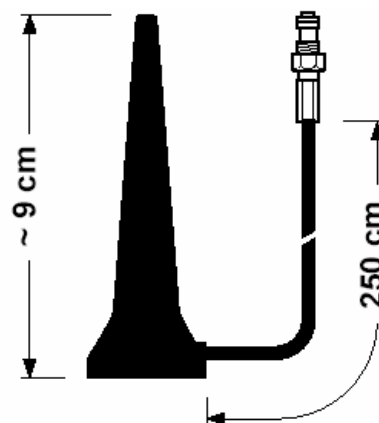
The Arctic EDGE Router includes a FME connector (male type) for an external antenna. It is possible to use any kind of external 50 Ω dual-band antenna intended for GSM900 (880–960 MHz) and GSM1800 (also known PCN) (1710–1880 MHz) frequency bands. Connect the antenna directly to the connector provided for the antenna on the back panel of the Arctic unit.

Typically, commercially available antennas are provided with a flexible 50 Ω cable having a length of 2–3 meters and having a female type FME-connector.

The Arctic EDGE Router is tested with antennas from Hirschmann Rheinmetall Elektronik GmbH. Examples of tested external antennas include the following sticker-type and magnetic mount antennas shown below:



MCA 18 90 STRIPE, sticker type patch antenna (above), and MCA 18 90 MH, magnetic mount antenna (right). Both antennas have a FME (female) connector and L=250 cm RG174 cable.



SIM Card and Card Holder

Standard 3 V SIM cards may be used with the Arctic EDGE Router. A SIM card holder is located on the back panel near the GPRS antenna connector. If you have the PIN code query enabled, first check that the Arctic Configurator has a correct PIN code entered in the GPRS submenu. To operate with SIM card follow the procedure below:

1. Power off the Arctic.
2. The SIM card holder contains a tray with a yellow eject button. Push this button in order to eject the tray from the holder.
3. Put the SIM card onto the tray.
4. Insert the tray carefully back to the holder and press the tray until it is locked.

The card should only be inserted or removed while the GSM module has been placed in shutdown mode. The SIM card holder has a card detection circuit that will in theory allow hot insertion and removal of the card. However, hot insertion and removal are not recommended, since the SIM card content may be corrupted if the card is removed while the GSM module is writing data to it.

Configuring Arctic GPRS Settings

This chapter describes how to get GPRS interface up. For this SIM card with GPRS enabled is required from you operator. GPRS settings (APN, username and password) also required from the mobile operator. Please note that Arctic device automatically switches between GPRS and EDGE networks without user interaction.

1. If your SIM card has the PIN code querying set, make sure you configure the PIN code before inserting the card in the card holder. If PIN querying is not set, you may proceed with the card installation procedure.
2. Connect to the Arctic and log in to Configurator.
3. Navigate to Network page from main navigation bar and select the GPRS sub page.

The screenshot shows the Arctic Configurator web interface. The top navigation bar includes 'System', 'Network', 'Firewall', 'Services', 'Applications', and 'Tools'. The left sidebar lists various configuration sections: Summary, Ethernet, GPRS, Dial-in, SSH-VPN, L2TP-VPN, Monitor, Routing, S-NAT, D-NAT, DNS Update, NTP, and SMS Config. The main content area is titled 'GPRS Settings' and contains the following fields and options:

- GPRS enabled: Yes (dropdown)
- Access Point Name (GPRS): INTERNET (text field)
- PIN code: NoPin (text field)
- DNS servers: User defined (dropdown)
- LED indication: Data only (dropdown)
- GPRS username: username (text field)
- GPRS password: passwd (text field)
- PPP idle timeout (sec): 1800 (text field)
- Maximum MTU value: 1500 (text field)
- Use GPRS as default route: ☒ Enabled, ☐ Disabled

At the bottom of the settings area are 'Apply' and 'Reset' buttons. At the bottom left of the interface are 'Commit', 'Reboot', and 'Logout' buttons. The footer text reads: 'Version 5.0.0, © 2002-2006 Viola Systems Ltd'.

4. Set the access point name (APN) appropriately according to your mobile operators settings (eg. "INTERNET" or "operatorname.com").
5. Set the GPRS network username and password appropriately if your GPRS service requires authentication.
6. If GPRS is used as default route, enable it. For example, if you just want to browse the internet over GPRS,
7. Optionally, set the PIN code and PPP idle timeout.
 - If your SIM card has the PIN code set, type the code into the PIN code field.
 - PPP idle timeout defines the time in seconds how often the Arctic resets the GPRS connection if the connection is idle.

8. ICMP Echo is used to monitor GPRS connection between Arctic and a remote host. If the designated host cannot be reached the GPRS connection is reset. This feature can be enabled from Network/Monitor menu. Please refer to previous chapter previous for more detailed description. **It is always recommended to enable the Monitor.**

9. Finally click **Apply** and then **Commit** to store the settings.

Reboot the Arctic for the settings to take effect. Check GPRS status from Network/Summary Menu.

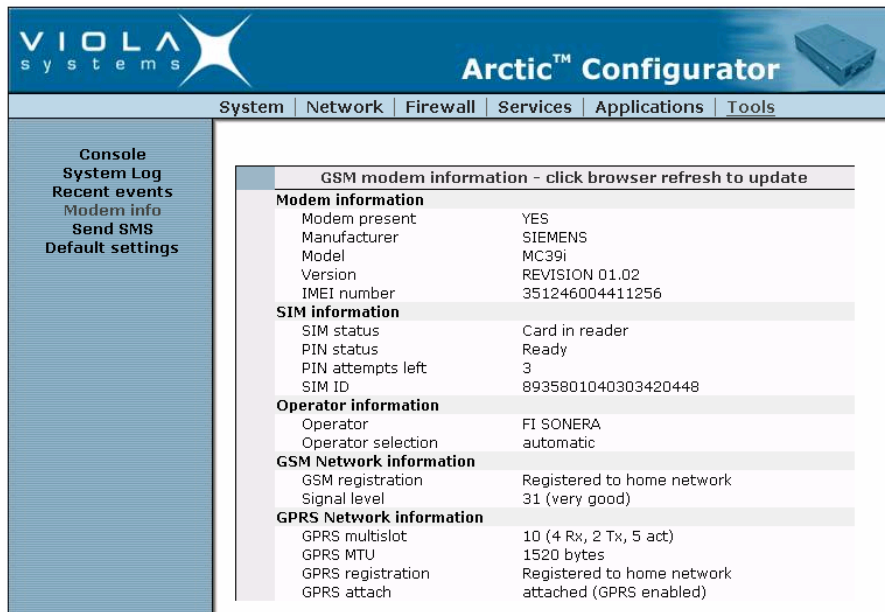
Network Interface Summary					
Ethernet (eth0)					
HW address	00:06:70:01:07:25				
Internet address	172.16.4.100				
Status	UP BROADCAST RUNNING MULTICAST				
Rx packets	90				
Tx packets	96				
Loopback (lo)					
Internet address	127.0.0.1				
Status	UP LOOPBACK RUNNING				
Rx packets	0				
Tx packets	0				
GPRS (ppp1)					
Internet address	83.100.36.214				
Status	UP POINTOPOINT RUNNING NOARP MULTICAST				
Rx packets	19				
Tx packets	23				
Running Routes					
Destination	Gateway	Genmask	Flags	Iface	
195.10.132.100	*	255.255.255.255	UH	ppp1	
62.236.160.177	*	255.255.255.255	UH	ppp1	
194.100.0.100	*	255.255.255.255	UH	ppp1	
192.168.254.254	*	255.255.255.255	UH	ppp1	
172.16.0.0	*	255.255.0.0	U	eth0	
127.0.0.0	*	255.0.0.0	U	lo	
default	192.168.254.254	0.0.0.0	UG	ppp1	
Running ARP cache					
Address	HWtype	HWaddress	Flags	Mask	Iface
172.16.4.15	ether	00:06:5B:C0:59:27	C		eth0

If “**Running Routes**” does not show **default** (default router/default route), it possible that network connection does not work correctly. Usually, either GPRS or VPN is the default route.

If the PIN code querying is enabled on the SIM card and the PIN code is entered wrongly three (3) times, the card locks up and will then require that an additional code is to be entered to open the card from locked state. It is thus important to set the code with the Arctic Configurator before plugging the SIM card in.

Useful GSM/GPRS Information

Useful GSM/GPRS information can be obtained from Tool/Modem Info Menu:



The screenshot shows the Arctic Configurator web interface. The top header includes the Viola Systems logo and the title 'Arctic™ Configurator'. Below the header is a navigation bar with tabs: System, Network, Firewall, Services, Applications, and Tools. On the left side, there is a sidebar menu with options: Console, System Log, Recent events, Modem info, Send SMS, and Default settings. The main content area displays 'GSM modem information - click browser refresh to update'. It contains several sections of information:

GSM modem information - click browser refresh to update	
Modem information	
Modem present	YES
Manufacturer	SIEMENS
Model	MC39i
Version	REVISION 01.02
IMEI number	351246004411256
SIM information	
SIM status	Card in reader
PIN status	Ready
PIN attempts left	3
SIM ID	8935801040303420448
Operator information	
Operator	FI SONERA
Operator selection	automatic
GSM Network information	
GSM registration	Registered to home network
Signal level	31 (very good)
GPRS Network information	
GPRS multislots	10 (4 Rx, 2 Tx, 5 act)
GPRS MTU	1520 bytes
GPRS registration	Registered to home network
GPRS attach	attached (GPRS enabled)

Troubleshooting

This Chapter provides a list of the common problems encountered while installing, configuring or administering the Arctic. If you are unable to resolve your problem, refer to the Warranty and Technical Support Sections at the end of this User's Guide for information about contacting Viola Systems Technical Support representatives.

Common Problems

Problem #1

Q: Console does not receive characters.

A: Disable HW and SW handshaking from your terminal software (e.g. Hyperterm or Minicom).

Problem #2

Q: GPRS interface is up but no traffic flows through it.

A: Default router in Ethernet settings submenu has to be set as "0" and also default router has to be enabled from Network/GPRS menu when using GPRS interface as the default router. Check routing from "Running Routes" in Network→Summary page.

Problem #3

Q: GPRS connection is not established.

A: Check that the SIM card has the correct PIN number settings and that it has not been locked after a wrong number was entered three times successively. PIN status can be checked from Tools/Modem Info menu.

Problem #4

Q: GPRS connection is ended after approximately two minutes.

A: You have enabled connection checking from Network/Monitor menu but not set the correct IP to GPRS "ICMP Echo settings".

Problem #5

Q: GPRS connection comes up, but I cannot browse the web

A: Check that your laptop has DNS servers configured correctly and default route is shown in "Running Routes" (Network→Summary page)

Technical Specifications

Processor	32-bit 48 MHz RISC Processor
Memory	32 MB RAM 8 MB Flash ROM
Network Interface	10/100 Base-T. Shielded RJ45 Ethernet (IEEE 802.3) 1.5 kV isolation transformer
Serial Device Interface	1 x Male DB9 connector DTE, 15kV ESD and short circuit protection RS-232 console port Speed: 19200 bit/s Data bits: 8, Stop bits: 1 Parity: None Flow control: None
Power Requirements	12 – 32 VDC, less than 500 mA (1–4 W power consumption) Resettable fuse and ESD protected input External 110–230 VAC adapter (optional)
Temperature Range	Operating: –20 to 75 °C Storage: –30 to 85 °C
Relative Humidity	Operating: 5 to 85 % RH non-condensing
Operating System	µCLinux embedded multitasking operating system
Network Protocols Supported	PPP, IP, ICMP, UDP, TCP, ARP, DNS, DHCP, FTP, TFTP, HTTP
Tunneling (VPN)	SSH-VPN client (requires Viola M2M Router) SSHv2 server and client SSHv1 server and client L2TP client
Management	WWW, SSH, Telnet and console FTP, TFTP and HTTP software update
Routing and Firewall	Static routing, proxy ARP, port forwarding, IP masquerading/NAT, firewall
Serial Device Connectivity	Simultaneous GPRS, CSD and SMS SMS configuration and status reporting
Dimensions and Weight	Stainless steel frame: Size: 225 mm × 115 mm × 45 mm (W×L×H) Weight: 1.1 kg optional DIN-rail mounting available

Limited Warranty

Coverage

Viola Systems warrants this hardware product to be free from defects in materials and workmanship for the warranty period. This non-transferable, limited warranty is only to you, the first end-user purchaser. The warranty begins on the date of purchase and lasts for the period specified below:

Arctic EDGE Router

one (1) year

Excluded Products and Problems

This warranty does not apply to: (a) Viola Systems software products; (b) expendable components such as cables and connectors; or (c) third party products, hardware or software, supplied with the warranted product. Viola Systems makes no warranty of any kind on such products which, if included, are provided "AS IS." Excluded is damage caused by accident, misuse, abuse, unusually heavy use, or external environmental causes.

Remedies

Your sole and exclusive remedy for a covered defect is repair or replacement of the defective product, at Viola Systems' sole option and expense, and Viola Systems may use new or refurbished parts or products to do so. If Viola Systems is unable to repair or replace a defective product, your alternate exclusive remedy shall be a refund of the original purchase price.

The above is Viola Systems' entire obligation to you under this warranty. IN NO EVENT SHALL VIOLA SYSTEMS BE LIABLE FOR INDIRECT, INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES OR LOSSES, INCLUDING LOSS OF DATA, USE, OR PROFITS EVEN IF VIOLA SYSTEMS HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. In no event shall Viola Systems' liability exceed the original purchase price of the device server. Some states or countries do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

Obtaining Warranty Service

You must notify Viola Systems within the warranty period to receive warranty service. During the warranty period, Viola Systems will repair or replace, at its option, any defective products or parts at no additional charge, provided that the product is returned, shipping prepaid, to Viola Systems. All replaced parts and products become the property of Viola Systems. Before returning any product for repair, customers are required to contact the Viola Systems.

Technical Support

Contacting Technical Support

Phone: +358 20 1226 226
Fax: +358 20 1226 220
E-mail: support@violasystems.com
Internet: <http://www.violasystems.com>

Recording Arctic Information

Before contacting our Technical Support staff, please record (if possible) the following information about your Arctic product:

Product name: _____

Serial no: _____

Note the status of your Arctic in the space below before contacting technical support. Include information about error messages, diagnostic test results, and problems with specific applications. If possible, please include the system log
